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Vanderbei

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[54] METHODS AND APPARATUS FOR EFFICIENT RESOURCE ALLOCATION

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[58] Field of Search 364/402; 379/113, 221; 340/827

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[57] ABSTRACT

A method and apparatus for optimizing resource allocations is disclosed which utilizes the Karmarkar algorithm to proceed in the interior of the solution space polytope. At least one allocation variable is assumed to be unconstrained in value. Each successive approximation of the solution point, and the polytope, are normalized such that the solution is at the center of the normalized polytope using a diagonal matrix of the current solution point. The objective function is then projected into the normalized space and the next step is taken in the interior of the polytope, in the direction of steepest-descent of the objective function gradient and of such a magnitude as to remain within the interior of the polytope. The process is repeated until the optimum solution is closely approximated.

The resulting algorithm steps are advantageously applied to the phase of one problem of obtaining a starting point, and to the dual problem, where the free variable assumption produces unexpected computational advantages.

15 Claims, 6 Drawing Sheets